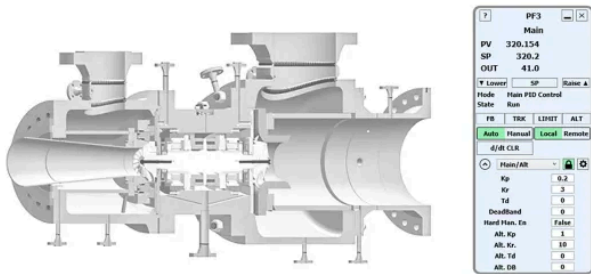


Expander Control

CCC's Expander Control optimizes energy recovery by managing expander speed and load for maximum efficiency. Integrated with other CCC controls, it ensures smooth, safe operation, reducing energy loss and boosting performance.

Overview



Maximize operability, uptime, and efficiency of your expander or compander trains.

Overview

Cryogenic expander-recompressor or compressor-expander (companders) operate in many processes like natural gas liquid plants, LNG plants, Ethylene plants, and more. Cryogenic capacity recovery and recompression capacity utilization can significantly improve process plant economics. Hot gas expanders have applications in refinery FCCU units and contribute to increasing efficiency in the process unit.

This turbomachinery equipment rotates at very high speed and is often driven by the same process gas that is compressed by the compressor connected on the same shaft, which poses unique challenges for sequencing and operation. Additionally, larger process trains adopt multiple expanders or companders in series and/or in parallel, requiring proper strategies for load-sharing and load-balancing.

CCC has extensive experience in control optimization for these types of machines, including patented algorithms that leverage coordinated control between the expander and compressor control applications.

What Is It

CCC's control applications are designed to provide coordinated control of the expander inlet guide vanes, Joule-Thompson valve, and compressor antisurge valve for your API 617 expander-recompressor or compander and to control a network of these machines.

How Does It Work?

CCC's expander control application regulates the expander inlet guide vanes and Joule-Thompson valve to provide accurate control of the main process control variable and ensures seamless transition between different operating modes. It is configured to perform automatic sequencing during startup and normal stop, and fast open-loop responses in case of emergency shutdown of the expander, to minimize process disturbance.

Coordinated control of the antisurge valves maximizes cryogenic capacity and deals with critical zone avoidance more efficiently and effectively.

For machines in series/parallel layout, CCC's proven load-sharing and load-balancing algorithm maximizes expander efficiency and capacity, resulting in significant improvements for the train.

Some of the key features of the CCC expander control applications include:

- Dynamic Set Point bias between inlet guide vanes and Joule-Thompson valve control applications
- Joule-Thompson Valve pre-positioning during expander trip

- Expander speed limiting by opening the antisurge valve
- Critical speed avoidance by opening the antisurge valve
- Coordinated sequencing of inlet guide vanes and Joule-Thompson valves during expander startup and stop
- Decoupling of inlet guide vanes, Joule-Thompson valve, and antisurge valve control
- Series/Parallel Load-sharing and Load-balancing for machines in series/parallel layout

What Problems Does It Solve?

- Stable Control: transitioning from Joule-Thompson valve and expander inlet guide vane control and quickly responding to expander trip helps maintain stable process control
- Maximize Production: coordinated control allows operators to leverage compressor load to maximize expander flow and cryogenic capacity
- Expander Network Control: proven algorithms to sequence, control, and balance machines in series/parallel layout



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